AMENDMENT

In the Title:

[High Accuracy] Measuring And Control Of Low Fluid Flow Rates with Heated Conduit Walls

In the Specification:

Please substitute the following rewritten paragraph 0001 in for original paragraph 0001.

[0001] The present application is a continuation-in-part of our co-pending U.S. Patent Application, "High Accuracy Measuring and Control of Low Fluid Flow Rates," Serial No.10/156,402 filed May 28, 2002, now U.S. Patent No. 6,736,005.

In place of the original paragraph 0001 in view of the corrections indicated below:

[0001] The present application is a continuation-in-part of our co-pending U.S. Patent Application, "High Accuracy Measuring and Control of Low Fluid Flow Rates," Serial No.10/156,402 filed May 28, 2002~~-~~, now U.S. Patent No. 6,736,005.

Please substitute the following rewritten paragraph 0006 in for original paragraph 0006.

[0006] Briefly, the present invention provides a new and improved system for measuring the flow of fluid in a conduit which is transporting the fluid. The system includes a flow sensing assembly contained in a housing which reduces unwanted temperature effects on the flow sensing measurements. The flow sensing assembly includes a set of at least two heat detectors mounted on the conduit in the flow sensing assembly at spaced positions from each other on the conduit. The heat detectors measure the temperature of the fluid and conduit at the spaced positions. A set of at least two power applicators is mounted on the conduit at different locations along the conduit. The power applicators apply electrical power in the form of pulses of

electrical current to the conduit to heat the conduit and the fluid in the conduit at an established temperature differential between the different locations. A control mechanism measures the level of power furnished to the power applicators to maintain the established temperature differential, and thus provide an indication of the flow rate based on the energy measured by the control mechanism.

In place of the original paragraph 0006 in view of the corrections indicated below:

[0006] Briefly, the present invention provides a new and improved system for measuring the flow of fluid in a conduit which is transporting the fluid. The system includes a flow sensing assembly contained in a housing which reduces unwanted temperature effects on the flow sensing measurements. The flow sensing assembly includes a set of at least two heat detectors mounted on the conduit in the flow sensing assembly at spaced positions from each other on the conduit. The heat detectors measure the temperature of the fluid and conduit at the spaced positions. A set of at least two power applicators is mounted on the conduit at different locations along the conduit. The power applicators apply electrical power in the form of pulses of electrical current to the conduit to heat the conduit and the fluid in the conduit at an established temperature differential between the different locations. A control mechanism measures the level of power furnished to the power applicators to maintain the established temperature differential, and thus provide an indication of the flow rate based on the energy measured by the control mechanism.

Please substitute the following rewritten paragraph 0012 in for original paragraph 0012.

[0012] Fig. 3 is a cross-sectional view taken along the lines 3-3 of Fig.2.

In place of the original paragraph 0012 in view of the corrections indicated below:

[0012] Fig. 3 is a cross-sectional view taken along the lines~~.~~ 3-3 of Fig.2.

Please add the following paragraph.

[0014] Fig. 5 is a functional block diagram of a flow control system according to the present invention.

Please substitute the following rewritten paragraph 0015 in for original paragraph 0014.

[0015] Fig. 6 is a schematic diagram of an adaptive response unit of the circuit of Fig. 4.

In place of the original paragraph 0014 in view of the corrections indicated below:

[00145] Fig. ~~5~~ 6 is a schematic diagram of an adaptive response unit of the circuit of Fig. 4.

Please substitute the following rewritten paragraph 0016 in for original paragraph 0015.

[0016] Fig. 7 is a schematic diagram of a pulse driver unit of the circuit of Fig. 4.

In place of the original paragraph 0015 in view of the corrections indicated below:

[00156] Fig. ~~6~~ 7 is a schematic diagram of a pulse driver unit of the circuit of Fig. 4.

Please delete the following paragraph 0016.

~~**[0016]** Fig. 7 is a schematic diagram of a flow control version of the flow rate sensor of Fig. 1.~~

Please substitute the following rewritten paragraph 0025 in for original paragraph 0025.

[0025] In the preferred embodiment, the second heat detector thermocouple 30 is mounted on the conduit C between the location of the applicators 18 and 26. It has been found with the present invention that a preferable location is midway between the applicators 18 and 26 or at a generally central location in the heat transfer section 14. The second heat detector 30 is located a suitable spaced distance along the heat transfer section 14 from thermocouple 12 to sense the temperature of the conduit C and its fluid contents at a location allowing for a measurable temperature differential to exist. The second temperature sensor thermocouple 30 detects any rise in temperature of the heat transfer section 14. Thus, for a fixed or given rise in temperature, the differential response is not sensitive to changes in ambient temperature of fluid entering the

system S. This, in conjunction with the stainless steel material of the conduit C discussed above, makes the output of the sensor less sensitive to changes in ambient temperature of the fluid. This is in contrast to flow sensors that rely on a change of resistance of the sensing element as the heat transfer rate changes with the rate of flow of the fluid.

In place of the original paragraph 0025 in view of the corrections indicated below:

[0025] In the preferred embodiment, the second heat detector thermocouple 30 is mounted on the conduit ~~30~~ C between the location of the applicators 18 and ~~30~~ 26. It has been found with the present invention that a preferable location is midway between the applicators 18 and ~~30~~ 26 or at a generally central location in the heat transfer section 14. The second heat detector 30 is located a suitable spaced distance along the heat transfer section 14 from thermocouple 12 to sense the temperature of the conduit C and its fluid contents at a location allowing for a measurable temperature differential to exist. The second temperature sensor thermocouple 30 detects any rise in temperature of the heat transfer section 14. Thus, for a fixed or given rise in temperature, the differential response is not sensitive to changes in ambient temperature of fluid entering the system S. This, in conjunction with the stainless steel material of the conduit C discussed above, makes the output of the sensor less sensitive to changes in ambient temperature of the fluid. This is in contrast to flow sensors that rely on a change of resistance of the sensing element as the heat transfer rate changes with the rate of flow of the fluid.

Please substitute the following rewritten paragraph 0026 in for original paragraph 0026.

[0026] As will be set forth, electrical current flows through the heat transfer section 14 in the walls of the conduit C between the electrical contacts 18 and 26 to maintain a specified temperature differential between the spaced location of the thermocouples 12 and 30 on the conduit C.

In place of the original paragraph 0026 in view of the corrections indicated below:

[0026] As will be set forth, electrical current flows through the heat transfer section 14 in the walls of the conduit C between the electrical ~~connectors 20~~ contacts 18 and 26 to maintain a specified temperature differential between the spaced location of the thermocouples 12 and 30 on the conduit C.

Please substitute the following rewritten paragraph 0030 in for original paragraph 0030.

[0030] The flow conduit 11 is subjected to electrical energy pulses between connectors 18 and 26. However, the flow conduit 11 is insulated from the block by the insulating ferrules 42a and 42b. Also, the conduit 11 is enclosed entirely within the body of the aluminum block 40. Thus, there is no electrical conduction to any entity outside the block 40.

In place of the original paragraph 0030 in view of the corrections indicated below:

[0030] The flow conduit 11 is subjected to electrical energy pulses between connectors 18 and 26. However, the flow conduit 11 is insulated from the block by the insulating ferrules 42a and 42b. Also, the conduit 11 is enclosed entirely within the body of the aluminum ~~bock~~ block 40. Thus, there is no electrical conduction to any entity outside the block 40.